PATENT CLAIMS

1. A method for the controlled separation of a dispersion of an aqueous solution and organic solution formed in the mixing section of an extraction step into their own phases during metal recovery in the separation section of a liquid-liquid extraction process, **characterised in that** the dispersion fed into the separation section is conducted into an outward flow field of said section, which field is formed by means of a partition wall in the separation section, and in which field the phases that have separated from the dispersion are made to flow substantially in the direction of the longitudinal axis of the separation section, but the dispersion remaining in the middle of the separated phases is dammed up by means of at least one reversing element placed in the rear part of the outward flow field extending from the sidewall of the separation section to the partition wall, the reversing element comprising at least two plate-like components, between which there is a reversing channel wherein the direction of the dispersion is substantially turned to a vertical flow; after the reversing element the direction of the dispersion and separated solution phases is reversed in the rear space of the separation section in substantially the opposite direction to flow back in the return flow field towards the feed end of the separation section, where the separated solutions are removed from the separation section.

2. A method according to claim 1, **characterised in that** the direction of flow of the dispersion and the separated solutions is substantially reversed in the front end of the return flow field, in the rear end of the separation section, to be parallel with the longitudinal axis of the separation section by means of a picket fence.

3. A method according to claim 1 or 2, **characterised in that** the cross-section of the flow fields decreases constantly in the direction of flow.

4. A method according to one of claims 1 - 3, **characterised in that** the length of the partition wall is 85 – 95% of the length of the settler.

5. A method according to one of claims 1 - 4, **characterised in that** the upper edge of a first plate-like component of the reversing element, the underflow plate, extends into the organic solution and the organic solution is made to flow through a slotted zone arranged in the upper part of the plate-like component into the rear space of the separation section as several sub-flows.

6. A method according to claim 5, **characterised in that** number of sub-flows is 10 – 100.

7. A method according to one of claims 1 - 6, **characterised in that** the dispersion flow dammed up by means of the first plate-like part of the reversing element is made to flow into the reversing channel from under the first plate-like part.

8. A method according to one of claims 1 - 7, **characterised in that** the dispersion that has flowed to the reversing element is made to flow into the rear space after the reversing element from above the last plate-like component of said reversing element.

9. A method according to one of claims 1 - 8, **characterised in that** the metal to be recovered is one of the metals copper, uranium, cobalt, nickel, zinc or molybdenum.

10. Equipment for a controlled separation of a dispersion of aqueous solution and organic solution formed in a mixing section (1) into their own phases during metal recovery in a liquid-liquid extraction settler (2), which comprises a feed end (6), rear end (7), sidewalls (8,9),

bottom (34) and headboxes of separated solutions (23,25), **characterised in that** the settler is equipped with a partition wall (10) dividing the settler into two sections, substantially parallel to the sidewalls of the settler, where said partition divides the settler into an outward flow field (11) and a return flow field (19), and with a reversing element (15) from the sidewall (8) to the end of the partition wall (10) located crosswise in relation to the longitudinal axis of the settler, where said reversing element comprises of at least two reverser plates (16,17) situated at different heights.

11. Equipment according to claim 10, **characterised in that** a picket fence (20) is located at the front end of the return flow field (19) in the rear part of the settler, which is fastened at one end to the end of the partition wall (10) and at its other end to the back of the sidewall (9) or to the corner of the sidewall (9) and rear end (7).

12. Equipment according to claim 11, **characterised in that** guiding plates are situated behind the slots in the picket fence to reverse the flow.

13. Equipment according to either claim 10 or 11, **characterised in that** the length of the partition wall (10) is 85 – 95% the length of the settler.

14. Equipment according to one of claims 10 –13, **characterised in that** the partition wall (10) forms an angle of 5 – 15° with the longitudinal axis of the settler so that the cross-section of the flow fields (11,19) formed by the partition wall decreases in the direction of flow.

15. Equipment according to one of claims 10 – 14, **characterised in that** the first reverser plate of the reversing element, the underflow plate (16), is located higher than the second, the overflow plate (17).

16. Equipment according to one of claims 10 – 15, **characterised in that** the upper edge of the first reverser plate (16) is located inside the organic solution in the settler.

17. Equipment according to one of claims 10 – 16, **characterised in that** the distance of the lower edge of the first reverser plate (16) from the bottom of the settler (34) is 15 – 30 % of the solution height of the settler.

18. Equipment according to one of claims 10 – 17, **characterised in that** the reverser plates (16,17) are mainly solid.

19. Equipment according to one of claims 10 – 18, **characterised in that** a slotted zone (27) is formed in the upper edge of the first reverser plate (16) of a distance corresponding to 5 – 25 % of the height of the reverser plate in question.

20. Equipment according to one of claims 10 – 19, **characterised in that** a slotted zone (30) is formed in the lower edge of the first reverser plate (16) of a distance corresponding to 5 – 15 % of the height of the reverser plate in question.

21. Equipment according to one of claims 10 – 14 or 18, **characterised in that** a slotted zone (32) is formed in the upper edge of the second reverser plate, the overflow plate (17) of a distance corresponding to 5 – 15 % of the height of the reverser plate in question.

22. Equipment according to one of claims 10 – 14, 18 or 21, **characterised in that** the distance of the lower edge of the second reverser plate (17) from the bottom of the settler is 3 – 10% of the solution height of the settler.

23. Equipment according to one of claims 10 – 14, 18 or 21 - 22, **characterised in that** the upper edge of the second reverser plate (17) is placed below the surface of the solution, to a distance that is 20 – 40 % of the solution height of the settler.

24. Equipment according to one of claims 10 – 23, **characterised in that** the reverser plates (16,17) of the reversing element are placed in the settler at a 10 – 30 ° angle to the vertical.

25. Equipment according to one of claims 10 - 24, **characterised in that** the upper edge of the reverser plates (16,17) is inclined towards the feed end (6) of the settler.

26. Equipment according to one of claims 10 – 25, **characterised in that** in front of the upper part of the slotted zone (32) of the second reverser plate (17) of the reversing element there is located a solid blocking plate (36) in the same direction as the reverser plate, and that the vertical position of said blocking plate can be changed using its support elements (37).

27. Equipment according to one of claims 10 – 26, **characterised in that** the headboxes (23,25) of the settler are located in front of the return flow field (19) at the feed end (6) of the settler.

28. Equipment according to one of claims 10 – 27, **characterised in that** the mixing section (1) is located in front of the outward flow field (11) of the settler.

29. Equipment according to one of claims 10 – 28, **characterised in that** the settler (2) is equipped with a picket fence (12) and/or other regulating elements (13,14,21,22) to control the flow.